

Appl. No. 10/616,020
Office Action Mailed June 10, 2005
Response Transmitted August 25, 2005

Attorney Docket 285/536

REMARKS

1. The application was filed with Claims 1-68. Applicants thank the Examiner for finding allowable subject matter in Claims 57-68 and in Claims 8, 10, 21, 27, 36, 44, 49-52, 55 and 56, if the claims are rewritten in independent format to include all the limitations of the base claim and all intervening claims.

2. The Examiner is thanked for his courtesy in granting an interview on July 20, 2005. During the interview, Claims 1, 3 and 5 were discussed. The undersigned attorney for the applicants pointed out that each optical sensor in embodiments of the present invention includes two optical fibers. The light emitted by one of the optical fibers is reflected into the other of the optical fibers, depending on the compression on the sensing pad in the area of the sensor. The undersigned also explained the meaning of the claim term "strain relief" as discussed in the application. Agreement was not reached on the claims.

3. The claim term "strain relief," used in Claims 4, 5, 18, 26, 34 and 43, is objected to on the basis that it is not adequately defined or described in the specification. Applicants traverse the objection. Relief is defined in Random House Webster's Unabridged Dictionary (2001 ed. at 1628) as a means or thing that relieves distress or anxiety, or the freeing of a closed space, such as a tank or a boiler, from more than a desirable amount of pressure. That is, a strain relief is something that helps to relieve strain. In addition, the term "strain relief" has a meaning well known to those with skill in the mechanical and electrical arts, i.e., a portion of a structure or a circuit that is able to move and relieve stress or strain rather than breaking or cracking.

In the present application, the term strain relief is used in several places in a manner consistent with these known definitions. In paragraphs 27 and 35, and in Fig. 2, strain relief 78 is depicted as a flexible pad, a piece of plastic or elastomer, adhered to the optical fibers and used to cover the optical fibers and allow them to move slightly rather than breaking. The term "strain relief" is also used to indicate an extra loop or

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length of optical fiber, curved in a manner to allow the optical fibers and sensors to move slightly rather than breaking when subjected to a heavy load. See paragraph 45.

Applicants have defined in the specification and drawings what is intended by the term "strain relief." These uses are consistent with dictionary definitions of "relief" and with the common use of the term in electrical and mechanical arts. Applicants submit that the term "strain relief" has sufficient definition in the application and to those having skill in the art to overcome the objection. The Examiner is respectfully requested to withdraw the objection to the term "strain relief."

4. Claims 1, 4-7, 12, 14-16, 18-19, 22, 24, 26, and 28 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 4,560,016 to Paul Ibanez et al. ("Ibanez"). The rejection does not cite specific passages in Ibanez as disclosing the limitations of the claims. Ibanez appears to show a single optical fiber (Fig. 1) or a plurality of optical fibers (Fig. 3). Each "sensor" in the pad is depicted in Fig. 2 as a microbending fixture 20 with a length of an optical fiber.

Claims 1 and 24 have been amended to more specifically define the optical sensor used in the claimed sensing systems. Support for the amendments is found at least in the specification at p. 11, lines 1-12 (paragraph 41). The amendments overcome the rejections in view of Ibanez, who does not disclose an optical sensor that comprises two optical fibers.

The rejection of Claims 4, 5, 18 and 26 is traversed. Ibanez does not teach or suggest a strain relief for each sensor. Ibanez uses a single optical fiber, or an array of optical fibers as depicted in Ibanez' Fig. 3. No strain relief is described in the patent or shown in the drawings, whether as a discrete component or as a design of the fiber array. A strain relief likely would not work in embodiments taught by Ibanez, because when a vehicle runs over Ibanez' pad, "said discrete microbending fixtures are caused to pinch said optic fiber . . . and said output transformer can calculate . . . the weight of the vehicle." Ibanez, col. 9, lines 47-52. Using a strain relief on Ibanez' fiber might cause a false reading on the microbending structures. The rejections of Claims 4, 5, 18

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and 26 are overcome because a strain relief is not taught by Ibanez and a strain relief appears to run counter to the principle used by Ibanez.

The rejection of Claim 7 is also traversed, because Ibanez does not teach a trench or cutout in a pad. As stated above, the rejection does not cite a passage or figure in Ibanez for this claim limitation, and as far as Applicants can discern, Ibanez does not disclose such a limitation. Accordingly, Claim 7 is also allowable. In addition, Claims 6, 12, 14-16, 19, 22, and 28 are allowable because they depend from one of allowable Claims 1, 18, or 24. The Examiner is respectfully requested to withdraw the rejection of Claims 1, 4-7, 12, 14-16, 18-19, 22, 24, 26, and 28 in view of Ibanez.

5. Claims 1, 17-18, 23-24, 26, 28-30, 38-39 and 46-48 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 6,353,394 to Junji Maeda et al. ("Maeda"). The rejection does not cite specific passages in Maeda as disclosing the limitations of the claims. Ibanez appears to show a single optical fiber (Fig. 2) comprising a plurality of sensors. Each "sensor" in the fiber is depicted in Fig. 2 as a loop comprising a length of the optical fiber.

As mentioned above, Claims 1 and 24 have been amended to more specifically describe the optical sensor used in embodiments of the present invention. Maeda uses a loop of a single fiber to form a sensor, and does not use a pair of discrete optical fibers to form a sensor. Accordingly, Maeda does not anticipate amended Claims 1 and 24. Maeda also does not teach or disclose the use of a strain relief, as required by Claim 18. A strain relief probably would render embodiments made according to Maeda's principles inoperative because the "physical quantity of light passing through the light transmissive loop" portions vary when the curvature radius of the loop varies as a result of the load on the seat. Maeda, col. 15, lines 29-33. In other words, Maeda's loops would not work without the strain imposed by the load. Since Maeda does not teach a strain relief, Claim 18 is allowable. Claims 17, 23, 26, 28 and 29 are also allowable because they depend from allowable Claims 1, 18 and 24.

Method Claim 30 is allowable because Maeda does not teach or suggest the Claim 30 limitations of assembling optical sensors onto an adhesive surface or

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assembling the ends of the sensors into terminations. Since Maeda uses multiple loops in a single wire, Maeda cannot have "ends" of the sensors within a pad. Maeda's loops also cannot have "terminations" as recited in Claim 30.

By the same arguments, Maeda does not teach or suggest the limitation of first or second interfaces that comprise "a first fiber from each sensor" and "a second fiber from each sensor," according to Claims 39 and 47. Therefore, Maeda does not teach or suggest the limitations of independent Claims 30, 39, and 47. Claims 30, 38, 39, and 46-48 are therefore allowable. The Examiner is respectfully requested to withdraw the rejection of Claims 1, 17-18, 23-24, 26, 28-30, 38-39 and 46-48 in view of Maeda.

6. Claims 2, 3, 9, 11, 13, 18, 19, 20, 23, 24, 25, 29, 30-34, 35, 37, 39-43, 45-48, and 53-54 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 4,560,016 to Paul Ibanez ("Ibanez") in view of U.S. Pat. No. 4,781,056 to Jacques Noel ("Noel"), and further in view of U.S. Pat. No. 6,353,394 to Junji Maeda ("Maeda"). The rejection generally does not cite specific passages in any of the references, simply stating that Noel teaches that silicone foam is a known substitute for hard rubber in an optical weighing device. Office Action, p. 3, lines 10-12, citing Noel, col. 4, lines 34-47. This passage in Noel, however, merely states that polyurethane foam may be used in an optical device for strain detection. Applicants are aware of both hard and soft polyurethane foams; a polyurethane foam is not necessarily hard. See Rubber Technology, 2d ed. 1973, Ch. 17, pp. 44-458, with several recipes for urethane rubbers with hardnesses from Shore A 65 to Shore D 55.

Applicants traverse the rejection. Adding Noel's polyurethane foam does not cure the deficiencies of Ibanez and Maeda with respect to teaching or suggesting claim limitations. For instance, Claims 2, 20, 39 and 53 recite specifically "silicone" foam, not polyurethane foam. In order to make a prima facie rejection, the references must disclose all the limitations of the claims. M.P.E.P. 2143 at 2100-129.

Noel likewise does not teach or suggest the limitation that each optical sensor comprises two optical fibers joined side by side at one end. Noel appears to teach an array of fibers in which light is transferred between fibers at intersections of the fibers.

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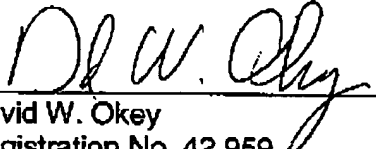
Noel, however, does not teach that the fibers are joined side by side at one end. Thus, Noel does not teach all the limitations of Claims 3, 11, amended Claim 24, 30, 32, 33, 39, 40, 47 and 53.

The Office Action also argues that Maede shows that it is obvious to use optical strain sensors in an automobile seat. Office Action, p. 3, lines 14-16. As far as Applicants can discern, this limitation applies to Claims 23, 29, 46 and 47, rejected in this portion of the Office Action. Claims 23, 29 and 46 are allowable because they depend from allowable Claims 18, 24 and 39. Claim 47 is allowable, per the arguments in paragraph 5 above, at least because it has other limitations not found in any of the references. In addition, Claims 9, 13, 19, 31, 34, 35, 37, 41, 42, 43, 45, 48 and 54 are allowable because they depend from allowable Claims 1, 18, 24, 30, 39, or 47.

7. The Examiner is respectfully requested to make of record two Information Disclosure Statements (with Forms PTO-1449) that were submitted on December 10, 2003, and April 19, 2004. The Office Action mailed June 10, 2005, did not contain an indication that the IDS's had been considered.

8. The Examiner is respectfully requested to enter the amendment, to withdraw the objections and rejections to the application, and to allow the claims of the application. If a telephone call to the undersigned would be of use to the Examiner, or would help to expedite prosecution of the application, the Examiner is invited to call the undersigned at the telephone number below.

Respectfully submitted,

 *Aug 25, 2005*
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